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EXAMINER	
KAU, STEVEN Y	

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2625	

NOTIFICATION DATE	DELIVERY MODE
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

Office Action Summary	Application No.	Applicant(s)	
	10/633,656	BOESTEN, HUBERTUS MARIE	
	Examiner	Art Unit	
	STEVEN KAU	2625	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE ____ MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☐ Claim(s) _____ is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☐ Claim(s) _____ is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicant's amendment was received on 10/30/2008, and has been entered and made of record. Currently, claims 1-19 are pending for further examination in this Action.

Specification

2. The corrected or substitute specification was received on 10/30/2008. The specification is acceptable.

Response to Remark/Arguments

3. Applicant's arguments with respect to claims 1-19 have been fully considered and the reply to the Remarks/Arguments is in the following:

- Applicant's arguments, "During the discussion, the supervisor indicated that a citation to the specification for the features in question would overcome this rejection", page 10, Remarks, with respect to claims 18-19 ***is incorrect***. The telephone interview on October 16, 2008 was conducted between Mr. Monico, the applicant's representative and the examiner only as stated in the *Interview Summary Sheet*. Thus, it is impossible to have "the supervisor indicated that a citation to the specification for the features in question would overcome this rejection". In addition, as indicated in the

Interview Summary Sheet, the box, “was not reached”, was checked for “agreement with respect to the claims”.

- Applicant’s arguments, “Applicant traverses the rejection of claims 18-19 under 35 U.S.C. § 112, first paragraph, in view of the fact that paragraph [056] of Applicant's specification describes a computer program (a.k.a. product) embodied on at least one computer-readable medium. Thus, claims 18-19 are compliant under 35 U.S.C. § 112, first paragraph”, Page 10, Remarks, with respect to 18-19 have been fully considered. The examiner considers that the flow diagram or steps provided in Fig. 4 is a high level algorithm for the computer program product, thus claims 18-19 meet the description requirements of 35 U.S.C. § 112, first paragraph. Therefore, the rejection of claims 18-19 under 35 U.S.C. § 112 first paragraph has been withdrawn.
- Applicant’s arguments, “Claims 14-17 are amended in response to the rejection under 35 U.S.C. § 112, first paragraph. Support for this amendment is found in Applicant's originally filed specification.1 No new matter is added. Thus, the rejection of claim 14 is overcome”, Page 11, Remarks with respect to claims 14-17 have been fully considered and are persuasive. The rejection of claims 14-17 under 35 U.S.C. § 101 has been withdrawn from the record.

Applicant's arguments, "Mahy describes a method and an apparatus for obtaining a gamut description of a multidimensional color reproduction device. The method is based on the transformation of several types of colorants boundaries that map to the boundaries of the color gamut of the device in color space. The Official Action asserts that Malay (col. 11, lines 36-44 and col. 12, lines 36- 67, and col. 13, line 61 - col. 14, line 12) discloses Applicant's claimed step of 'determining for the defined discrete colour points, different subsets of colorants and associated coverage fractions thereof.' Applicant traverses", page11, Remarks.

Applicant argues , "First, Applicant notes that col. 10, line 5 of Mahy describes that 'It is possible to indicate that, assuming that a color can be rendered by only one set of colorants, the physical boundaries indeed correspond to boundaries in color space. This is demonstrated by means of FIGS. 3 and 4. For a point A inside the colorant gamut, there exists a corresponding point A' in color space.' Thus, Malay limits a color (color point) to one set of colorants, and does not determine different subsets of colorants for defined discrete color points", Page 12, Remarks.

In re, the Examiner respectfully disagrees with the conclusion. Applicant drawn a conclusion of "**Thus, Malay limits a color (color point) to one set of colorants, and does not determine different subsets of colorants for defined discrete color points**" from col 10, line 5 of Mahy that "**It is possible to indicate that, assuming that a color can be rendered by only one set of colorants, the physical boundaries indeed correspond to boundaries in color space. This is demonstrated by means of FIGS. 3 and 4. For a point A inside the colorant gamut, there exists a corresponding point A' in color space**" is incorrect. As applicant admitted that Mahy

discloses “describes a method and an apparatus for obtaining a gamut description of a multidimensional color reproduction device” and not just “Thus, Malay limits a color (color point) to one set of colorants, and does not determine different subsets of colorants for defined discrete color points”. However, as Mahy points out, "**It is possible to indicate that, <u>assuming</u> that a color can be rendered by <u>only one set of colorants</u>, the physical boundaries indeed correspond to boundaries in color space.**” For example, in the real world of printing practice, a monochrome printer prints only one color or multidimensional color reproduction apparatus is configured to print black and white or one color only. This is demonstrated by means of FIGS. 3 and 4 providing the assumption that "**a color can be rendered by only one set of colorants**". For point A inside the colorant gamut, there exists a corresponding point A' in color space. For the case, as indicated in Figs 3 and 4, for point A inside the colorant gamut, there exist point A’ in color space. This example demonstrates the relationship of one of subset discrete color points between a colorant space and a color space, and a color gamut and a color space. One ordinary skill in the art at the time the invention was made understands that for multidimensional color reproduction, which involves multiple color gamuts, sets of colorants, color points and sets of halftone dots, etc. For example, in col 7, lines 30-50, Mahy states that, “**In a three dimensional color space, a color gamut is a solid. For describing this solid, the color gamut is preferentially intersected by a plurality of surfaces in color space. <u>A surface is a set of points</u> according to two degrees of freedom, and may be curved. A plane is a specific embodiment of a surface. A more accurate description of the color gamut may be obtained by intersecting it <u>by more</u>**

<u>surfaces</u>. <u>For each surface, all points on the surface</u>, which belongs to the color gamut, are situated in one or more connected regions", (emphasis is added by the examiner). Color points are defined or characterized by vector values are disclosed in col 10, line 5 to col 11, line 44. Point A is a discrete color point of a surface, a surface is a set of points and the color gamut may be obtained by intersecting it <u>by more surfaces</u>. Colorants or inks associate with color Point A is a subset of colorants in the surface. **<u>A point next to color Point A in the surface is its neighboring color point, the colorants or inks associate with the point next to Point A is also a subset of colorants in that surface, the color gamut may be obtained by intersecting it by more surfaces, and so on</u>**. Thus, by simply quoting that "Thus, Malay limits a color (color point) to one set of colorants, and does not determine different subsets of colorants for defined discrete color points" is not persuasive.

Applicant further argues, "Second, cited col. 11, lines 36-44, of Mahy only describes that that for every couple, a set of two values can be found that meet a particular equation. If these two values of are real and at least one of the two colorant combinations belongs to the colorant gamut, the corresponding color belongs to such a natural boundary. The sets of two solutions that correspond to couples form two natural boundary surfaces. FIG. 5 of Mahy shows two natural boundary surfaces of the process of which the Neugebauer primaries are given in Table 1 of Malay. However, the quadratic equation parameters associated with the color boundary determination of Mahy are not related to determining for the defined discrete colour points, different

subsets of colorants and associated coverage fractions thereof. Cited col. 12, lines 36-67, of Mahy also does not describe determining for the defined discrete colour points, different subsets of colorants and associated coverage fractions thereof", page 12, Remarks.

In re, the examiner respectfully disagrees with the above arguments. Refer to Figs. 3 and 4, Mahy defines a set of color points, which are discrete points, and can be a sunset of points because "A surface is a set of points according to two degrees of freedom, and may be curved. A plane is a specific embodiment of a surface. A more accurate description of the color gamut may be obtained by intersecting it by more surfaces. For each surface, all points on the surface, which belongs to the color gamut, are situated in one or more connected regions", col 7, lines 30-50. Mahy's disclosure, as a whole, is to "describes a method and an apparatus for obtaining a gamut description of a multidimensional color reproduction device" and not just "Thus, Malay limits a color (color point) to one set of colorants, and does not determine different subsets of colorants for defined discrete color points". And as cited col. 11, lines 36-44, "This indicates that for every couple (c_1, c_2) a set of two values c_3 can be found that meet the equation. If these two values of c_3 are real and at least one of the two colorant combinations (c_1, c_2, c_3) belongs to the colorant gamut, the corresponding color belongs to such a natural boundary. The sets of two solutions c_3 that correspond to couples (c_1,c_2) form two natural boundary surfaces. FIG. 5 shows two natural boundary surfaces of the process of which the Neugebauer primaries are given in Table 1" and giving the

fact that Mahy discloses Table 2, col 12, where he demonstrates "a number of examples based on the separation of colors for the printing process presented in Table 1. The first seven columns contain an index, followed by the XYZ and CIELAB values of a color of particular interest. The last three columns represent the colorant combination(s) that correspond to these colors. A first color "1" is a very special case in that it can be rendered with two colorant combinations that each lie on a physical boundary. This color is the "cross point" of the two physical boundaries in FIG. 2. Color "2" also lies on a physical boundary, but can be rendered with only one colorant combination. The color "3" is the most "normal" case since it lies inside the physical boundary and can be separated into just one set of colorant. Color "4" provides an example of a color that lies on a physical boundary, yet this physical boundary lies inside the color gamut. As expected this color can be separated into two sets of colorant: one of course lies on the physical boundary, the other one does not. Color "5" lies outside the physical boundary yet inside the natural boundary of the process and can be separated into two sets of colorant. Finally the last color lies on the natural boundary that forms the "real" gamut boundary of this printing process. In the above example, a physical boundary was found that falls partially within the color gamut. There is no reason why the opposite could not happen, namely that a natural boundary would fall within the color gamut. In general, the color gamut of a 3-ink process is obtained by calculating both the physical and the natural boundaries, and taking the envelope of both of them." Thus, at least by inherent, or by logically, Point A in Figs 3 and 4, or "for every couple (c_1, c_2) a set of two values c_3" is for mathematical demonstration and these

Points and couples can be applied to any discrete points and any color set or subset of colorants or inks in the surface. Further, a couple of (c_1, c_2) colorant or ink is also a subset of “every couple (c_1, c_2) a set of two values c_3" in the color gamut and color space. Thus, the above argument “Mahy are not related to determining for the defined discrete colour points, different subsets of colorants” is not persuasive.

Applicant continues to argue, “Third, cited col. 13, line 61 - col. 14, line 12 of Mahy describes that in the case of an n- ink process with n>4, natural and hybrid boundary types also have to be considered. However, Mahy further notes that in practice it is safe to take into account only the physical and natural boundaries of the 3-ink boundary processes. This means that the color gamut of art n-ink process is the union of the color gamuts of all its 3-ink boundary processes. As the color gamut of art n- ink process is the union of the color gamuts of its 3-ink boundary processes, a color gamut descriptor for 3 colorant has to be presented. For a 3-ink process, only two kinds of boundary surfaces have to be taken into account, i.e. the physical and natural colorant boundaries. If a gamut descriptor consisting of a set of contours is used, for example the cross sections of the color gamut with equiluminance planes, only a method of the intersection with the natural planes has to be presented. However, development or exploitation of the color gamut of an n-ink process are not related to determining for the defined discrete colour points, different subsets of colorants and associated coverage fractions thereof”, pages 12-13, Remarks.

In re, the examiner respectfully disagrees with the above statements. The development or exploitation of the color gamut of an n-ink process is indeed related to determining for the defined discrete colour points, different subsets of colorants. Since the color gamut of art n-ink process is the union of the color gamuts of all its 3-ink boundary processes, n-ink process can be divided into multiple 3-ink boundary processes. For the 3-ink boundary process, Mahy provides detail discussion of how to define a discrete color point. For instance, a transformation of a discrete color point A in colorant space to the point A' in color space of Fig. 3; physical boundary of a 3-ink process of Fig. 4; natural boundary of a 3-ink process of Fig. 5 and two natural boundaries in the c_1, c_2, c_3 colorant space of the process, and col 9, line 49 to col 12, line 35. Thus, the development or exploitation of the color gamut of an n-ink process, and all of its 3-ink boundary processes, discrete color points are defined, and different sets or subsets of colorants are determined for a real a multidimensional color reproduction device. Because Van de Capelle teaches a colorant coverage fraction **(e.g. coverage percentage, or fraction of N colorants, Fig. 8 and col 6, lines 20-31 & col 8, lines 9-23**); therefore, Mahy combined with Van de Cappelle teach and suggest "determining for the defined discrete colour points, different subsets of colorants and associated coverage fractions thereof". For this reason, claim 1 is unpatentable over Mahy (US 5,872,898) in view of Van de Capelle (7,123,380). Claims 14 and 18 are in corresponding to claim 1, thus claims 14 and 18 are also unpatentable over Mahy (US 5,872,898) in view of Van de Capelle (7,123,380).

With respect to claim 2, applicant argues, “Turning now to dependent claim 2, Applicant submits that Malay uses the cited c1, c2 and c3 parameters as dot percentages, not as color indications. A dot percentage may be considered equivalent to a coverage fraction. Mahy discloses how the boundary of a gamut can be constructed, but does not disclose or suggest composing a color point with various colorants. Thus, Malay does not disclose or suggest a halftone screen associated to a colorant in a subset rendering a first colour point is associated to the same said colorant, if present, in a subset rendering a neighboring colour point of said first colour point. Therefore, claim 2 patentably defines over the applied references for independent reasons.”

In re, the examiner disagrees with the above statement. Firs, the statement of “Malay uses the cited c1, c2 and c3 parameters as dot percentages, not as color indications” is incorrect. The cited c1, c2 and c3 parameters are not as dot percentages but are for colorant value indicator. For instance, refer to Fig. 3, Point A is in a colorant space while Point A' is in the corresponding color space. The incremental colorant changes Δc1, Δc2, and Δc3 induce the changes of V1, V2 and V3, respectively. Giving Point A associates with 3-inks or 3-colorants, <u>a surface is a set of points</u> and the color gamut may be obtained by intersecting it <u>by more surfaces</u> (see the above discussion). Thus, Point A is a discrete point of a surface and the colorants associated with Point A is a subset of colorants of a surface. A point next to Point A in the surface is a neighboring color point, a surface is cover with points with their associate inks or

colorants. Further, “The printing with three inks c1, c2 and c3 by means of three halftone screens results theoretically in eight possible combinations of colorant overlap, called the Neugebauer primaries”, col 2, line 66 to col 3, line 3. One ordinary skill in the art at the time the invention was made certainly knows how to apply halftone screens which “associated to a colorant in a subset rendering a first colour point is associated to the same said colorant, if present, in a subset rendering a neighboring colour point of said first colour point.” Thus, Mahy indeed teaches and suggests “a halftone screen associated to a colorant in a subset rendering a first colour point is associated to the same said colorant, if present, in a subset rendering a neighboring colour point of said first colour point.”

With respect to claims 4-8, applicant argues, “Turning now to dependent claims 4-8, the image graininess processing of Ito is not related to a graininess calculated for a discrete colour point. That is, one skilled in the art of rendering colors in a printing system would not consider the image processing technologies of Ito when addressing issues of graininess.

In KSR v. Teleflex (127 S. Ct. 1727, 1740 (2007)), the Court noted that

> "[u]nder the correct analysis, any need or problem known in the field of endeavor at the time of invention and addressed by the patent can provide a reason for combining the elements in the manner claimed." The Court also noted that "a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense, h that instance the fact that a combination was obvious to try might show that it was obvious under § l03.

However, the Court went on to note that

"rejections on obviousness grounds cannot be sustained by mere conclusory statements; instead, there must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness."

Here, however, the Official Action fails to provide a rational reason, due to either a misunderstanding of the invention/references or hindsight reasoning, for replacing or augmenting , the gamut boundary calculations of Mahy with the image processing features of Ito. Thus, Applicant requests that the present rejection of claims 4-8 under 35 U.S.C. § 103(a) be withdrawn."

In re, the examiner disagrees with the above conclusion. First, applicant argues that "the image graininess processing of Ito is not related to a graininess calculated for a discrete colour point". However, it is incorrect. Ito, the same field of endeavor, discloses an image processing method, where the graininess and/or sharpness of the original image is calculated for picture elements, or pixels, or points. For example, "The graininess estimating means 3 also comprises a comparison means 11 for comparing a pixel value of each of pixels in each of the images represented by image signals HL0, LH0, HH1, which have been obtained from the wavelet transform means 10, and a predetermined threshold value with each other. The graininess estimating means 3 further comprises a variance value calculating means 12 for calculating a variance value B of pixel values of pixels in the image, which is represented by an image signal HH0, in accordance with the results of comparison made by the comparison means 11", col 14, lines 42-52, and the equations/formulas of the wavelet transform means 10 of Fig. 2 for

pixel graininess calculation where "in which (x, y) represents the spatial coordinates of the pixel", col 15, line 18, and so on. Giving the fact that Mahy teaches and suggests "determine different subsets of colorants for defined discrete color points" and the fact that Ito teaches and suggests "a graininess calculated for a discrete colour point", one ordinary skill in the art at the time the invention was made would have motivated to modify Mahy to include the "a graininess calculated for a discrete colour point", since doing so, would have improved the image reproduction quality. The examiner presents the factual finding that the instant invention has been taught and suggested, and the factual finding is definitely not as what the applicant concluded that "Here, however, the Official Action fails to provide a rational reason, due to either a misunderstanding of the invention/references or hindsight reasoning, for replacing or augmenting, the gamut boundary calculations of Mahy with the image processing features of Ito".

The examiner would like to remind the applicant that

- Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns,* 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).
- Should amendment be made, applicant is remind to comply with 37 U.S.C. 1.173(c), which requires that "Whenever there is an amendment to the claim pursuant to paragraph (b) of this section, there must also be supplied, on pages separate from the pages containing the changes, the status (i.e. pending or canceled), as of the date of the amendment, of all

patent claims and of all added claims, and an explanation of the support in the disclosure of the patent for the changes made to the claims"

The examiner also references the applicant to the claims rejection section below for the explanation on how the prior art references read on the amended claims.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 1, 2, 4-16 and 18-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mahy (US 5,872,898) in view of Van de Capelle (7,123,380) and further in view of Ito (US 6,801,339) and Dalal et al (US 5,892,891).

Regarding claim 1.

Mahy discloses a method of rendering colours in a printing system (**e.g. a printer model, col 1, lines 48-65, and col 14, lines 13-16**) using a set of N colorants (**e.g. a set of colorants in n-dimension, col 1, lines 48 52**), including, for each colour to be rendered (**e.g. Figs. 3 & 4, col 10, lines 5-16**), a selection of a subset of M colorants whereby M<N and for each colorant of said subset (**e.g. col 2, lines 4-11**), a selection of a halftone screen among a plurality of available halftone screens (**e.g. for a 3-ink process, three halftone screens are used; in the actual ink process, or printer**

model calculation, must select a halftone screen among the three screens, col 2, line 66 through col 3, line 5), the method comprising steps: defining discrete colour points in at least a portion of a colour space **(e.g. point A in Figs. 3 & 4, col 10, lines 50-65)** ; determining for the defined discrete colour points **(col 10, line 50 through col 11, line 25**), different subsets of colorants **(e.g. col 11, lines 36-44 for three ink process, & four ink process in col 12, lines 36-67, & n-ink process, col 13, line 61 through col 14, line 12**), rendering each of said colour points **(e.g. Figs. 3 & 4, col 10, lines 5-16)**; determining lists of colorant subsets rendering the defined discrete colour points **(e.g. col 11, lines 36-44 for three ink process, & four ink process in col 12, lines 36-67, & n-ink process, col 13, line 61 through col 14, line 12**), and selecting one of said lists of subsets of colorants for said lists **(e.g. subset of c1, c2 of said list c1, c2, c3 for three ink process, col 11, 36-44, and & four ink process in col 12, lines 36-67, & n-ink process, col 13, line 61 through col 14, line 12**).

Mahy does not explicitly disclose a coverage fraction, calculating for each of said subsets an associated graininess value, said lists being consistent with respect to the attribution of a halftone screen to a colorant within a subset over said portion of the colour space; and selecting one of said lists of subsets of colorants on the basis of a total graininess calculated for said lists.

Van de Capelle teaches a colorant coverage fraction **(e.g. coverage percentage, or fraction of N colorants, Fig. 8 and col 6, lines 20-31 & col 8, lines 9-23**); and

Ito teaches calculating for each of said subsets an associated graininess value (**e.g. providing a graininess estimate method of Figs. 1 and 2, & col 14, line 5 through col 16, line 67 and so on, graininess value of a subset colorants of inks can be calculated**); and

Dalal teaches said lists being consistent with respect to the attribution of a halftone screen to a colorant within a subset over said portion of the colour space (**Dalal discloses that different four-color sets of halftone screens would be used, each set using the same screen angles for complementary colors, col 8, lines 1-9**).

Having a method of rendering colours of Mahy' 898 reference and then given the well-established teaching of Van de Capelle' 380 reference, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Mahy' 898 reference to include a coverage fraction as taught by Van de Capelle' 380 reference since doing so would be able to determine which set of ink printed at what surface producing a desired color (col 7, line 11-21, Van de Capelle) and further the coverage percentage calculation provided could easily be established for one another with predictable results; and then would have modified Mahy' 898 reference combining with Van de Capelle' 380 reference to include calculating for each of said subsets an associated graininess value as taught by Ito' 339, since doing so would be able to minimize graininess and thus good image quality could be reproduced (col 1, lines 55-65, Ito) and the methodology of graininess calculation provided could be implemented with predictable result; finally, would have modified the combination of Mahy, Van de Capelle and Ito to include said lists being consistent with respect to the

attribution of a halftone screen to a colorant within a subset over said portion of the colour space as taught by Dalal' 891 for color complement with a predictable result.

Regarding **claim 2**.

Mahy discloses that a first colour point **(e.g. a color point A shown in Figs. 3 & 4)** is associated to the same said colorant **(e.g. colorant c)**, if present, in a subset rendering a neighboring colour point of said first colour point **(e.g. color point A is a color point in a physical boundaries lies inside the color gamut, col 10, line 50 through col 11, line 58)**.

Mahy does not disclose a list of colorant subsets is consistent with respect to the attribution of a halftone screen to a colorant within a subset over said portion of the colour space if a halftone screen associated to a colorant in a subset rendering.

Dalal teaches wherein a list of colorant subsets is consistent with respect to the attribution of a halftone screen to a colorant within a subset over said portion of the colour space **(See Claim 1 discussion)** if a halftone screen associated to a colorant in a subset rendering **(Dalal discloses that colors in the main gamut will be printed with a CMYK set of screens, while colors in the extended gamut 102 will be printed with the MYKO set of screens: in either cases, only four halftone screens need to be accommodated in a pattern on the printing surface. That is, each halftone screen is used for each colorant in either main or extended gamut – col 7, lines 19-35)**.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Mahy to include a list of colorant subsets is

consistent with respect to the attribution of a halftone screen to a colorant within a subset over said portion of the colour space if a halftone screen associated to a colorant in a subset rendering as taught by Dalal thus to complementing colors for printing.

Regarding **claim 4**.

Mahy discloses a list is a combination for each discrete colour point of the considered portion of the colour space (**Figs. 1-5, col 1, line 46 to col 2, line 11 and col 10, line 50 to col 11, line 44**).

Mahy does not teach calculating graininess.

Ito teaches calculating graininess (**Figs. 1 & 2, col 14, line 6 to col 16, line 32**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Mahy to include calculating graininess as taught by Ito to improve image reproduction quality (col 1, lines 55-65).

Regarding **claim 5**.

Mahy discloses each discrete colour point of the considered portion of the colour space is a combination of each colorant in the subset of colorants rendering said discrete colour point (**e.g. Figs 1-5, three ink process, col 11, 36-44, and & four ink process in col 12, lines 36-67, & n-ink process, col 13, line 61 through col 14, line 12**).

Mahy does not disclose calculating graininess.

Ito teaches calculating graininess (**Figs. 1 & 2, col 14, line 6 to col 16, line 32**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Mahy to include calculating graininess as taught by Ito to improving image reproduction quality.

Regarding **claim 6**.

Mahy does not teach wherein the selected list is the list showing the minimum calculated graininess.

Ito teaches wherein the selected list is the list showing the minimum calculated graininess (**e.g. the main idea of having minimum calculated graininess is to for inspection; however, Ito teaches a method and a device to inspect or estimate the level of graininess, col 9, lines 11-25**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Mahy to include the selected list is the list showing the minimum calculated graininess taught by Ito to obtain higher image reproduction quality (col 1, lines 55-65).

Regarding **claim 7**, the structure elements of method claim 6 perform all steps of method claim 7. Thus claim 7 is rejected under 103(a) for the same reason discussed in the rejection of claim 6.

Regarding **claim 8**, the structure elements of method claim 6 perform all steps of method claim 8. Thus claim 8 is rejected under 103(a) for the same reason discussed in the rejection of claim 6.

Regarding **claim 9**, the structure elements of method claim 1 perform all steps of method claim 9. Thus claim 9 is rejected under 103(a) for the same reason discussed in the rejection of claim 1.

Regarding **claim 10**, the structure elements of method claim 9 perform all steps of method claim 10. Thus claim 10 is rejected under 103(a) for the same reason discussed in the rejection of claim 9.

Regarding **claim 11**, the structure elements of method claim 9 perform all steps of method claim 11. Thus claim 11 is rejected under 103(a) for the same reason discussed in the rejection of claim 9.

Regarding **claim 12**, the structure elements of method claim 9 perform all steps of method claim 12. Thus claim 12 is rejected under 103(a) for the same reason discussed in the rejection of claim 9.

Regarding **claim 13**, the structure elements of method claims 6 and 9 perform all steps of method claim 13. Thus claim 13 is rejected under 103(a) for the same reason discussed in the rejection of claims 6 and 9.

Regarding **claim 14**.

Mahy discloses a printing system **(e.g. Method and apparatus of calculating color gamut forms a "printing System", col 6, lines 45-53 and a printer model, col 1, lines 48-65, and col 14, lines 13-16)** rendering colours by selecting subsets of M colorants rendering said colours among a set of colorants whereby M < N (**e.g. col 2, lines 4-11**), and halftone screens associated to said colorants in the subset (**e.g. for a 3-ink process, three halftone screens are used; in the actual ink process, or**

printer model calculation, must select a halftone screen among the three screens, col 2, line 66 through col 3, line 5), the system comprising: the controller configured to define discrete colour points in at least a portion of a colour space (**e.g. color point A is defined in Figs. 3 & 4, such that "Point A is in a colorant space while Point A' is in the corresponding color space. The incremental colorant changes Δc1, Δc2, and Δc3 induce the changes of V1, V2 and V3, respectively", col 9, lines 8-11 & col 10, lines 50-65, in order to define a color point in a colorant space, it must have a controller or a processor or a CPU to perform such determining colorant changes of Δc1, Δc2, and Δc3 and the induction of V1, V2 and V3.**); determine for the defined discrete colour points (**Giving Point A associates with 3-inks or 3-colorants, a surface is a set of points and the color gamut may be obtained by intersecting it by more surfaces. Thus, Point A is a discrete point of a surface and the colorants associated with Point A is a subset of colorants of a surface. A point next to Point A in the surface is a neighboring color point**), different subsets of colorants (**e.g. col 11, lines 36-44 for three ink process, & four ink process in col 12, lines 36-67, & n-ink process, col 13, line 61 through col 14, line 12**), render each of said colour points (**e.g. Figs. 3 & 4, col 10, lines 5-16**); determine lists of colorant subsets rendering the defined discrete colour points (**e.g. col 11, lines 36-44 for three ink process, & four ink process in col 12, lines 36-67, & n-ink process, col 13, line 61 through col 14, line 12**), said lists being consistent with respect to the attribution of a halftone screen to a colorant within a subset over said portion of the colour space; and

select one of said lists of subsets of colorants (**e.g. subset of c1, c2 of said list c1, c2, c3 for three ink process, col 11, 36-44, and & four ink process in col 12, lines 36-67, & n-ink process, col 13, line 61 through col 14, line 12**).

Mahy does not explicitly disclose a memory; a controller operatively connected to the memory; a coverage fraction, calculating for each of said subsets an associated graininess value, said lists being consistent with respect to the attribution of a halftone screen to a colorant within a subset over said portion of the colour space; and selecting one of said lists of subsets of colorants on the basis of a total graininess calculated for said lists.

Van de Capelle teaches a memory (**e.g. memory system of Fig. 1, col 5, lines 25-45**), a controller (**e.g. processor**) operatively connected to the memory (**e.g. processor communicates with a number of peripheral devices including memory, col 5, lines 25-45**); and a colorant coverage fraction (**e.g. coverage percentage, or fraction of N colorants, Fig. 8 and col 6, lines 20-31 & col 8, lines 9-23**); and

Ito teaches calculating for each of said subsets an associated graininess value (**e.g. providing a graininess estimate method of Figs. 1 and 2, & col 14, line 5 through col 16, line 67 and so on, graininess value of a subset colorants of inks can be calculated**); and

Dalal teaches said lists being consistent with respect to the attribution of a halftone screen to a colorant within a subset over said portion of the colour space (**Dalal discloses that different four-color sets of halftone screens would be used, each set using the same screen angles for complementary colors, col 8, lines 1-9**).

Having a method of rendering colours of Mahy' 898 reference and then given the well-established teaching of Van de Capelle' 380 reference, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the method of Mahy' 898 reference to include a memory, a controller operatively connected to the memory, and a coverage fraction as taught by Van de Capelle' 380 reference since doing so would be able to determine which set of ink printed at what surface producing a desired color (col 7, line 11-21, Van de Capelle) and further the coverage percentage calculation provided could easily be established for one another with predictable results; and then would have modified Mahy' 898 reference combining with Van de Capelle' 380 reference to include calculating for each of said subsets an associated graininess value as taught by Ito' 339, since doing so would be able to minimize graininess and thus good image quality could be reproduced (col 1, lines 55-65, Ito) and the methodology of graininess calculation provided could be implemented with predictable result; finally, would have modified the combination of Mahy, Van de Capelle and Ito to include said lists being consistent with respect to the attribution of a halftone screen to a colorant within a subset over said portion of the colour space as taught by Dalal' 891 for color complement with a predictable result.

Regarding **claim 15**, Mahy discloses a list of subsets of colorants rendering the colour points (**Figs. 1-5, col 1, line 46 to col 2, line 11 and col 10, line 50 to col 11, line 44**), the halftone screens associated thereto (**e.g. for a 3-ink process, three halftone screens are used; in the actual ink process, or printer model calculation,**

must select a halftone screen among the three screens, col 2, line 66 through col 3, line 5).

Mahy does not disclose a memory unit, coverage fraction and a look-up table.

Van de Capelle teaches a memory unit **(Fig. 5, col 12, lines 63-67**), a coverage fraction (**e.g. coverage percentage, or fraction of N colorants, Fig. 8 and col 6, lines 20-31 & col 8, lines 9-23**) and look-up table **(col 7, line 66 to col 8, line 8**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Mahy to include a memory unit, coverage fraction and a look-up table as taught by Van de Capelle to improve processing speed and reduce storage size of the color information of an image.

Regarding **claim 16**, recites identical features as claim 2, except claim 16 is a system claim. Thus, arguments similar to that presented above for claim 2 are also equally applicable to claim 16.

Regarding **claim 18**, recites identical features as claim 1, except claim 18 is a computer program product claim. Thus, arguments similar to that presented above for claim 1 are also equally applicable to claim 18.

Regarding **claim 19**, recites identical features as claim 4, except claim 19 is a computer program product claim. Thus, arguments similar to that presented above for claim 4 are also equally applicable to claim 19.

6. Claims 3 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mahy (US 5,872,898) in view of Van de Capelle (7,123,380) and further in view of Ito

(US 6,801,339) and Dalal et al (US 5,892,891) as applied to claims 1 and 14, and further in view of Ebner (US 5,689,344).

Regarding **claim 3**.

Mahy discloses wherein a list of colorant subsets is a subset over said portion of the colour space (**e.g. subset of c1, and c2 are portion of 3-dimentional color space, col 11, lines 36-44**), in a subset rendering a neighboring colour point of said first colour point (**e.g. col 11, lines 36-44 for three ink process, & four ink process in col 12, lines 36-67, & n-ink process, col 13, line 61 through col 14, line 12**), and a first colorant in a subset rendering a colour point and to a different second colorant rendering a neighbouring colour point of first said colour point (**e.g. in a 3-ink process of 3-dimensional color space, Mahy discloses the relationship of color point and associated colorants and its neighboring color points, Figs. 1-6 and col 1, line 50 through col 2, line 29, col 11, lines 36-44 for three ink process, & four ink process in col 12, lines 36-67, & n-ink process, col 13, line 61 through col 14, line 12 and so on**).

Mahy does not teach attribution of a halftone screen, if a halftone screen associated to a colorant in a subset rendering a first colour point is associated to the same said colorant, threshold and coverage fraction.

Dalal teaches attribution of a halftone screen (**e.g. screen angles, col 8, lines 1-9**), if a halftone screen associated to a colorant in a subset rendering a first colour point is associated to the same said colorant (**Dalal discloses that colors in the main gamut will be printed with a CMYK set of screens, while colors in the extended**

gamut 102 will be printed with the MYKO set of screens: in either cases, only four halftone screens need to be accommodated in a pattern on the printing surface. That is, each halftone screen is used for each colorant in either main or extended gamut – col 7, lines 19-35).

Van de Capelle teaches coverage fraction (**e.g. coverage percentage, or fraction of N colorants, Fig. 8 and col 6, lines 20-31 & col 8, lines 9-23**).

Ebner discloses a threshold (**e.g. the halftoning system using a desired screen matrix have N number of threshold and N number of threshold values in a K x L matrix, each threshold corresponding to a printer signal in an image to be printed, the method comprising the steps of determining a percentage of coverage reduction required to mitigate tenting deletions, col 3, lines 10-27**).

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention to have modified Mahy to include attribution of a halftone screen (**e.g. screen angles, col 8, lines 1-9**), if a halftone screen associated to a colorant in a subset rendering a first colour point is associated to the same said colorant as taught by Dalal for color complementary and image reproduction quality improvement; and would have modified the combination of Mahy and Dalal to include a colorant coverage fraction to minimize image graininess for better image reproduction quality; and finally would have modified the combination to include a threshold taught by Ebner to prevent printing of corresponding image signals, the percentage related to the coverage reduction percentage; printing a image signals for each threshold value which is exceeded in the screen matrix (col 3, lines 24-27).

Regarding **claim 17**, the structure elements of method claim 3 perform all steps of printing system claim 17. Thus claim 17 is rejected under 103(a) for the same reason discussed in the rejection of claim 3.

Conclusion

7. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven Kau whose telephone number is 571-270-1120 and fax number is 571-270-2120. The examiner can normally be reached on Monday to Friday, from 8:30 am -5:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David Moore can be reached on 571-272-7437. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/Steven Kau/
Examiner, Art Unit 2625
01/02/2009

/King Y. Poon/
Supervisory Patent Examiner, Art Unit 2625